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TITLE: Magnetohydrodynamic Turbulence and Reconnection in the Magnetotail (*Invited*)

SESSION TYPE: Oral

SESSION TITLE: SM53A. Multiscale Turbulence and Stochastic Wave-Particle Interactions in Planetary Magnetospheres II

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ABSTRACT BODY: We have used a global MHD simulation with high spatial resolution to investigate the origin and properties of turbulence in the plasma sheet. In this simulation we imposed a steady southward IMF with a magnitude of 5 nT at the upstream simulation boundary for more than three hours followed by ninety minutes of northward IMF of the same magnitude. The solar wind number density was 20 cm⁻³, the thermal pressure was 20 pPa, and the velocity was 500 km/s in the x direction. The moderately high dynamic pressure confined the magnetotail to the high-grid resolution region. Even for these nominal solar wind parameters and steady driving the plasma sheet became turbulent. The power spectral densities and probability distribution functions computed from the simulations were comparable to those obtained from spacecraft observations. The largest scale vortices were associated with reconnection outflows and, in the southward IMF case, with the diversion of high speed flows in the near-Earth region. Both time and space domain analyses revealed that there were three scales present, the large scale of the driving processes, the intermediate inertial scale and the dissipative scale.

KEYWORDS: [2723] MAGNETOSPHERIC PHYSICS / Magnetic reconnection, [2744] MAGNETOSPHERIC PHYSICS / Magnetotail, [2764] MAGNETOSPHERIC PHYSICS / Plasma sheet.

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Additional Details